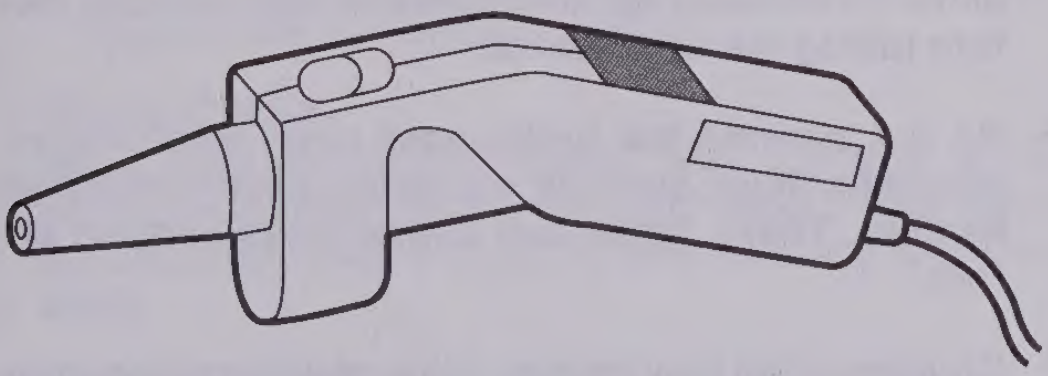
80T-IR

INFRARED TEMPERATURE PROBE

C. 1
Rev. 1
DEC 93

Instruction Sheet

FLUKE®



INTRODUCTION

The Fluke 80T-IR Infrared Temperature Probe (the probe) is a noncontact temperature measurement accessory for use with a digital multimeter (DMM). The probe has a temperature range of -18°C to 260°C (0°F to 500°F), with a basic accuracy of 3% of reading, and an output of 1 mV dc per °C or °F.

Temperature is measured by pointing the probe at the surface to be measured, and reading the temperature on the DMM display.

Box Contents

Temperature Probe, Battery (installed), Instruction Sheet, Quick Reference Card and Warranty Card.

Safety Information

The 80T-IR complies with IEC Publication 1010-1-1990 including Amendment 1, CSA C22.2 No. 231, ANSI/ISA-S82.01 and .03 Safety Standards.

CAUTION

- **Do not place the probe on or around hot objects (70°C / 158°F). It may cause damage to the probe case.**

- **If the probe is exposed to significant changes in ambient temperature (hot to cold or cold to hot), allow 20 minutes for temperature stabilization, before taking measurements.**

- **Do not operate the probe near large electrical or magnetic fields such as arc welders and induction heaters. These fields can cause measurement errors.**

- **Condensation may form on the lens when going from a cold to hot environment - wait 10 minutes for condensation to dissipate before taking measurements.**

- **Connectors must only be plugged into voltage measurement input jacks of a DMM.**

- **Do not touch or hold by the front cone. Temperature readings can be affected by heat from the hand.**

- **Equipment use not specified by manufacturer may impair safety.**

Compatibility

The probe is compatible with all DMMs that have a minimum of 10 M input impedance and accept safety shrouded, standard diameter 0.16 in. (4 mm) banana plugs.

Operation

To take a measurement, perform the following steps:

1. Plug the red connector into the V dc input jack and the black connector into the common or ground input jack on the DMM.

2. Select mV dc on the DMM.

3. Slide the probe switch forward to the "ON" position.

4. Point the tip of the probe at the object to be measured.

5. Read the DMM display.

Additional considerations are:

- After 10 minutes of use the probe will automatically shift to Sleep mode (the display will show 0°C or 0°F). It can be restarted by sliding the switch to "OFF" and then to "ON" (see Table 1).

- Sleep mode extends battery life. However, for maximum battery life, switch the probe to the "OFF" position.

- The temperature scale can be changed to °C or °F by removing the battery from the battery compartment and moving the internal °C/°F switch to the desired position. (see Figure 1).

- If the DMM displays OL, switch the DMM range from mV dc to V dc. Increasing the range to V dc moves the decimal position three places to the left (500°F displays as 0.500V).

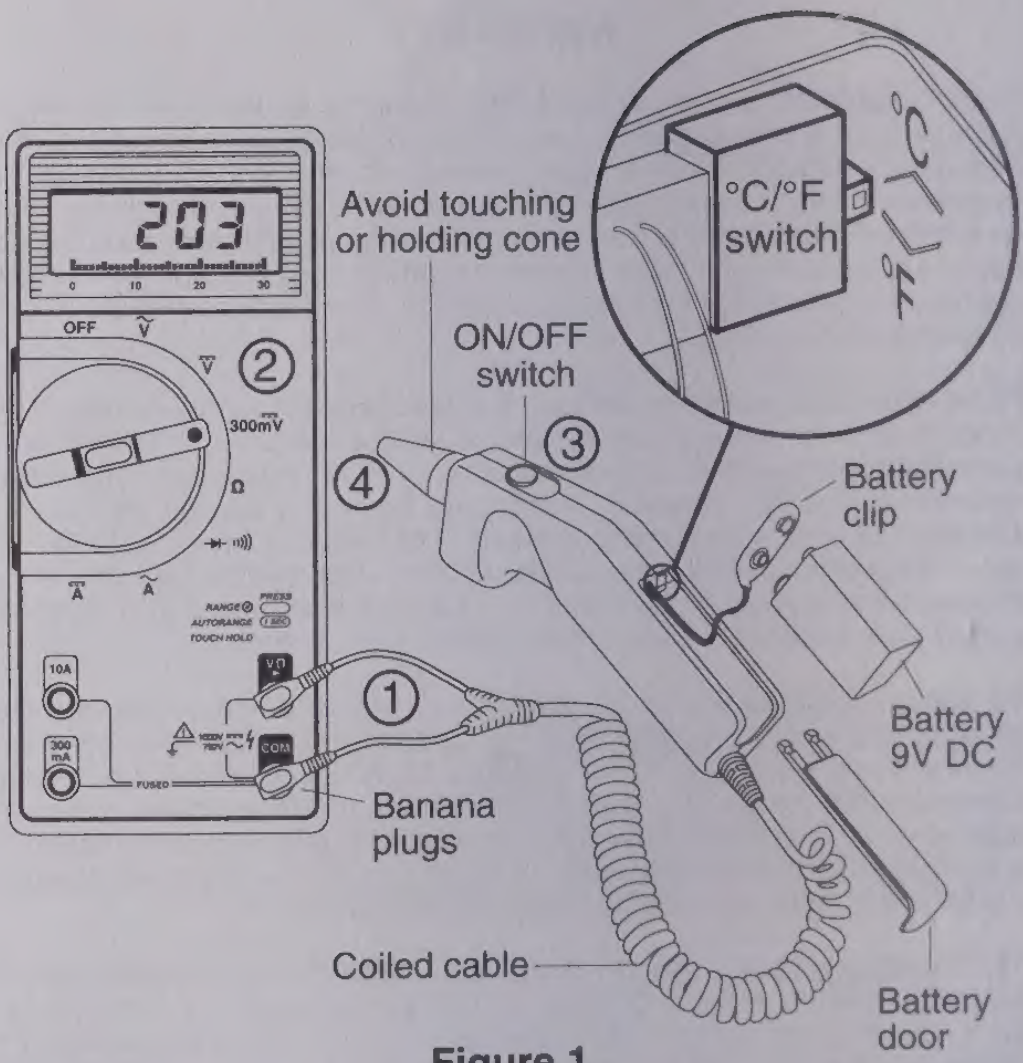


Figure 1.

Display Codes

Under the conditions shown in Table 1, the meter will alternate between displaying a reading and Display Code.

Emissivity

All objects emit invisible infrared energy. The amount of energy emitted is proportional to the object's temperature and its ability to emit IR energy. This ability, called emissivity, is based upon the material that the object is made of and its surface finish. Emissivity values range from 0.10 for a very reflective object to 1.00 for a black body. The probe senses this energy and calculates the temperature based on the amount of IR energy it receives and a factory set emissivity value of 0.95, which will cover 90% of typical applications.

Table 1.

Display Codes*	Condition	Action
270°C (518°F) or -30°C (-22°F)	Target temperature is over or under range.	Select target within probe's specified temperature range.
280°C (536°F) or -45°C (-49°F)	The temperature of the probe is near either the high or low ambient operating range limit.**	Ensure that the probe is within the specified ambient operating range.
-60°C (-76°F)	Battery power is low.	Replace the battery.
0°C (0°F)	Sleep mode or battery is dead.	Restart the probe by sliding switch to "OFF" and then to "ON", or replace battery.

* Values may vary ±5 degrees depending on DMM accuracy.

** Although a display code may be present, the displayed reading is valid if the probe is within the specified ambient operating range.

Distance to Spot Size Ratio

Distance to Spot Size Ratio (or Field of View) refers to the diameter of the spot that the probe is sensing at a given distance. The closer you are to the object (or target), the smaller the area (or spot) the probe is sensing. For example when the probe is held at a 200 mm (8 in.) distance from the target, the spot size is approximately 50 mm (2 in.); at 100 mm (4 in.) the spot size is approximately 25 mm (1 in.), and with the probe held at a 50 mm (2 in.) distance from the target, the spot size is approximately 13 mm (1/2 in.). Hot spots can be missed if too large an area is included in the field of view, so get as close as possible! (See Figure 2)

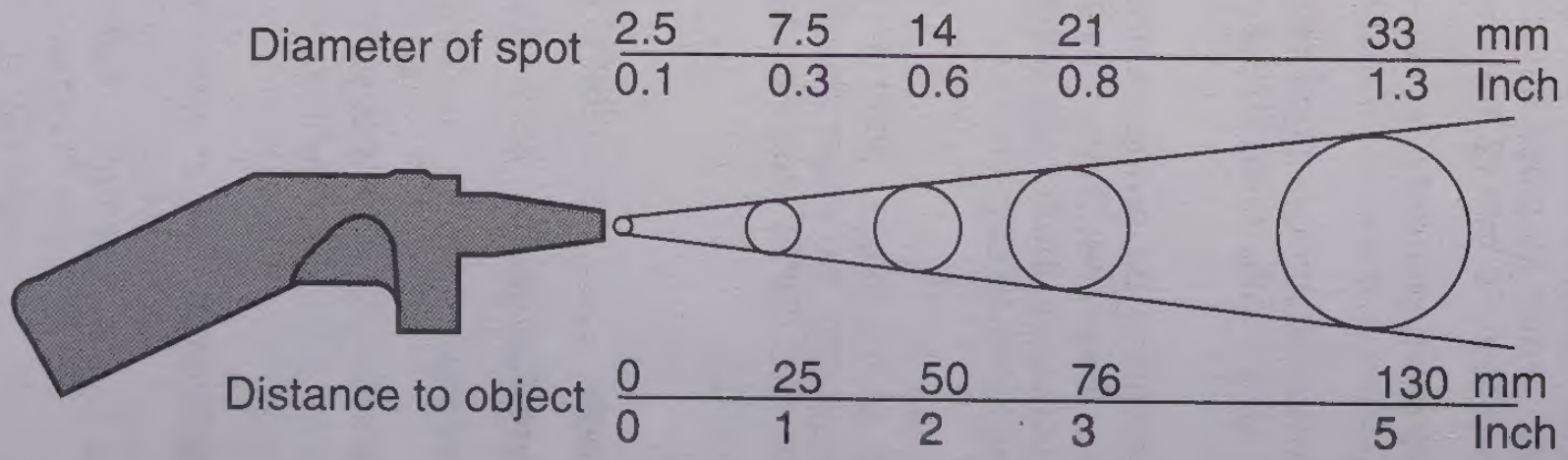


Figure 2.

Spot size increases with distance from the probe tip, as shown

Measurement Considerations

- If the surface to be measured is small (13 mm (1/2 in.) or less), hold the probe as close as possible to the surface (no more than 50 mm (2 in.) away).
- If the surface to be measured is covered by frost or other material, clean it to expose the surface.
- If the surface to be measured is highly reflective, apply masking tape or a matte finish black paint to the surface.
- If the probe seems to be giving incorrect readings check the front of the probe. There may be condensation or debris obstructing the sensor; clean per instructions in the maintenance section.

Quick Check

For a quick check of the probe, point it directly at ice immersed in water (slush), the meter should read, within specifications limits, 0°C (32°F) (see Accuracy specifications).

Specifications

Temperature Range: -18 to 260°C (0 to 500°F)

Ambient Operating Range: 0 to 63°C (32 to 145°F)

Accuracy (for 1 year): ±3% of reading or ±3°C (±5°F), whichever is greater, @ 18 to 28°C (64 to 82°F) ambient operating temperature

Temperature Coefficient: ±0.2% of reading or ±0.2°C (±0.3°F), whichever is greater, change in accuracy per °C change in ambient operating temperature above 28°C (82°F) or below 18°C (64°F).

Response Time: 1 second

Spectral Response:	8 to 14 microns nominal
Emissivity:	pre-set 0.95
Output:	1 mV/degree °C or °F
Relative Humidity:	95% RH or less @ 30°C (86°F) noncondensing, Temp. Coef. applies
Storage Temperature:	-25 to 70°C (-13 to 158°F) without battery
Power:	9V battery; (NEDA 1604A, 6F22, 006P)
Battery life (Alkaline):	50 hours typical, @ 23°C (73°F) 33% duty cycle
Dimensions:	(L x W x H) 180 mm x 30 mm x 50 mm (7.1 in.) x (1.2 in.) x (2 in.)
Weight:	180 gm (6.4 oz)

MAINTENANCE

Battery Replacement

Remove battery door (See Figure 1.) and replace with a 9V Alkaline battery (ANSI/NEDA 1604A, IEC 6LR61).

Front-Window Cleaning (as necessary)

1. Blow off loose particles using clean compressed air.
2. Gently brush remaining debris away with a camel hair brush or Q-tip.
3. Carefully wipe the surface with a moist Q-tip. The swab may be moistened with water or a water-based glass cleaner. Allow to air dry. (Do not use solvents to clean the window.)

Case Cleaning

To clean the exterior housing, simply use soap and water or a mild commercial cleaner. Wipe with a damp sponge or soft rag.

WARRANTY

Fluke Corporation (Fluke) warrants this product to be free from defects in material and workmanship under normal use and service for a period of 1 year from date of shipment. Software is warranted to operate in accordance with its programmed instructions on appropriate Fluke products. It is not warranted to be error free. This warranty extends only to the original purchaser and shall not apply to fuses, computer media, batteries or any product which, in Fluke's sole opinion, has been subject to misuse, alteration, abuse or abnormal conditions of operation or handling.

Fluke's obligation under this warranty is limited to repair or replacement of an product which is returned to an authorized service center within the warranty period and is determined, upon examination by Fluke, to be defective, If Fluke determines that the defect or malfunction has been caused by misuse, alteration, abuse, or abnormal conditions of operation or handling, Fluke will repair the product and bill the purchaser for the reasonable cost of repair. If the product is not covered by this warranty, Fluke will, if requested by purchaser, submit an estimate of the repair costs before work is started.

To obtain repair service under this warranty purchaser must forward the product, (transportation prepaid) and a description of the malfunction to the nearest Fluke Service Center. The product shall be repaired at the Service Center or at the factory, at Fluke's option, and returned to purchaser, transportation prepaid. The product should be shipped in the original packing carton or a rigid container padded with at least four inches of shock absorbing material. FLUKE ASSUMES NO RISK FOR IN-TRANSIT DAMAGE.

THE FOREGOING WARRANTY IS PURCHASER'S SOLE AND EXCLUSIVE REMEDY AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY, OR FITNESS FOR ANY PARTICULAR PURPOSE OR USE. FLUKE SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OR LOSS WHETHER IN CONTRACT, TORT, OR OTHERWISE.

CLAIMS

Immediately upon arrival, purchaser shall check the packing container against the enclosed packing list and shall, within thirty (30) days of arrival, give Fluke notice of shortages or any nonconformity with the terms of the order. If purchaser fails to give notice, the delivery shall be deemed to conform with the terms of the order.

The purchaser assumes all risk of loss or damage to products upon delivery by Fluke to the carrier. If an product is damaged in transit, PURCHASER MUST FILE ALL CLAIMS FOR DAMAGE WITH THE CARRIER to obtain compensation. Upon request by purchaser, Fluke will submit an estimate of the cost to repair shipment damage.

Fluke will be happy to answer all questions to enhance the use of this product. Please address your requests or correspondence to: Fluke Corporation, P.O. Box 9090, Everett, WA 98206-9090, Attn: Sales Department. For European Customers: Fluke Europe B.V., P.O. Box 1186, 5602 B.D., Eindhoven, The Netherlands.

Service

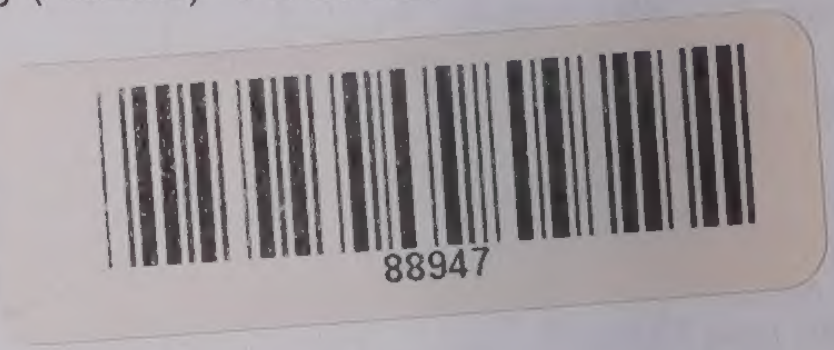
To order parts or for service information in the U.S.A., call 1-800-825-9810. Outside the U.S.A., contact the nearest Fluke Service Center.

Calibration

Fluke recommends that the user return the probe annually to a Fluke Service Center for calibration, starting one year after purchase.

Replacement Part

Battery (Alkaline) - PN 614487



For application or operation assistance or information on Fluke products, call:
800-44-FLUKE (800-443-5853) in U.S.A. and Canada
31 40 723-220 in Europe
206-356-5500 from other countries

Fluke Corporation
P.O. Box 9090
Everett, WA
98206-9090

Fluke Europe B.V.
P.O. Box 1186
5602 B.D. Eindhoven
The Netherlands

PN 935072
February 1993
Rev.1, 12/93
©1993 Fluke Corporation. All rights reserved. Printed in U.S.A.